DETAILED ACTION

Claims 1, 7, 9-10, 13, 16-21, 23-24, 27-28, 30, 42, 45, and 48-56 are pending. Claims 2-6, 8, 11-12, 14-15, 22, 25-26, 29, 31-41, 43-44, and 46-47 have been canceled. Claims 1, 7, 9-10, 13, 16-21, 23-24, 27-28, 30, 42, 45, and 48-56 have been examined. Claims 1, 7, 9-10, 13, 16-21, 23-24, 27-28, 30, 42, 45, and 48-56 have been allowed.

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Attorney Jeffrey Hood on 6/29/2010.

1. Claim 1 has been amended as following:

A computer-implemented method comprising:

a computer system receiving user input selecting a plurality of simulation engines corresponding to a value chain;

the computer system assembling in a memory a set of models that represent components of the value chain, wherein each of the models of said set of models includes one or more variables, where each of said one or more variables is defined on a corresponding range, wherein at least one of the models of said set of models is a high-resolution geocellular reservoir model;

the computer system selecting values of the variables in their respective ranges to create instantiated models, wherein said selecting values of the variables in their respective ranges is performed according to an operational mode, wherein the operational mode is selected by a user from a set of operational modes including a Monte Carlo mode, a discreet combinations mode and a sensitivity analysis mode;

the computer system assembling the instantiated models into a workflow;

the computer system executing the simulation engines on the workflow to generate data output, wherein the simulation engines include one or more physics-based flow simulators for simulating reservoirs, wells and surface-pipeline hydraulics, wherein the simulation engines also include an economic computation engine; and

the computer system storing the selected values of the variables and the data output from the one or more simulation engines to a memory;

the computer system repeatedly performing a set of operations including said selecting, said assembling the instantiated models, said executing and said storing.

2. Claim 10 has been amended as following:

A computer-implemented method comprising:

a computer system receiving input specifying a user's selection of a plurality of simulation engines associated with a value chain;

the computer system assembling in a memory a set of models that represent components of the value chain, wherein each of the models of said set includes one or more random variables, wherein at least one of the models of the set of models is a high-resolution geocellular reservoir model;

the computer system instantiating the ~~random~~ variables of each model to determine instantiated models, wherein said instantiating the ~~random~~ variables includes instantiating a value of a first one of the ~~random~~ variables, wherein said selecting values of the variables in their respective ranges is performed according to an operational mode, wherein the operational mode is selected by a user from a set of operational modes including a Monte Carlo mode, a discreet combinations mode and a sensitivity analysis mode ~~wherein said value is instantiated in a quantile range [QA, QB] based on a user-specified probability distribution and user- specified integers A and B which are between zero and 100 inclusive~~;

the computer system assembling the instantiated models into a workflow;

the computer system executing the simulation engines on the workflow to generate data output, wherein the simulation engines include one or more physics-based flow simulators for simulating reservoirs, wells and surface-pipeline hydraulics, wherein the simulation engines also include an economic computation engine; and

the computer system storing the data output from the simulation engines to a memory;

the computer system repeatedly performing a set of operations including said instantiating, said assembling the instantiated models, said executing and said storing.

3. Claim 13 has been amended as following:

A computer-implemented method comprising:

a computer system computing an instantiated value of each random variable in a set of ~~random~~ variables, wherein said selecting values of the variables in their respective ranges is performed according to an operational mode, wherein the operational mode is selected by a user from a set of operational modes including a Monte Carlo mode, a discreet combinations mode and a sensitivity analysis mode;

the computer system selecting a first geocellular reservoir model from a collection of high-resolution geocellular reservoir models based on a first subset of the instantiated values;

the computer system resolving uncertain dates for events in one or more schedules using a second subset of the instantiated values in order to determine resolved event dates in the one or more schedules;

the computer system executing a simulation engine on an input data set including the first geocellular reservoir model and the resolved event dates, wherein the simulation engine includes one or more physics-based flow simulators for simulating reservoirs, wells and surface-pipeline hydraulics, wherein the simulation engine also includes an economic simulator; and

the computer system capturing data generated by the simulation engine in response to said execution to a storage medium;

the computer system repeatedly performing a set of operations, wherein the set of operations includes said computing, said selecting, said resolving, said executing and said capturing.

4. Claim 17 has been amended as following:

A computer system comprising:

a memory storing program instructions;

a processor configured to read the program instructions from the memory, wherein the program instructions are executable by the processor to:

assemble a set of models, wherein each of the models of said set of models includes one or more variables, where each of said one or more variables is defined on a

corresponding range, wherein at least one of the models of said set is a high-resolution geocellular reservoir model;

select values of the variables in their respective ranges to create instantiated models, wherein said selecting values of the variables in their respective ranges is performed according to an operational mode, wherein the operational mode is selected by a user from a set of operational modes including a Monte Carlo mode, a discreet combinations mode and a sensitivity analysis mode;

execute a well-perforator program on one or more well plans included in the instantiated models in order to determine perforation locations for the one or more well plans;

assemble the instantiated models and the perforation locations into a workflow; and

execute a plurality of simulation engines on the workflow, wherein the simulation engines include one or more physics-based flow simulators for simulating reservoirs, wells and surface-pipeline hydraulics, wherein the simulation engines also include an economic computation engine;

repeatedly perform a set of operations, wherein the set of operations includes said selecting, said executing the well-perforator program, said assembling the instantiated models and the perforation locations, and said executing the simulation engines.

5. Claim 19 has been amended as following:

A computer-readable memory medium storing program instructions, wherein the program instructions are configured to direct one or more computers to:

assemble a set of models, wherein each of the models of said set includes one or more variables, where each of said one or more variables varies in a corresponding range,

wherein at least one of the models of said set is a high-resolution geocellular reservoir model;

select values of the variables in their respective ranges to create instantiated models, wherein said selecting values of the variables in their respective ranges is performed according to an operational mode, wherein the operational mode is selected by a user from a set of operational modes including a Monte Carlo mode, a discreet combinations mode and a sensitivity analysis mode;

execute a well-perforator program on one or more well plans included in the instantiated models in order to determine perforation locations for the one or more well plans;

assemble the instantiated models and the perforation locations into a workflow;

execute a plurality of simulation engines on the workflow, wherein the simulation engines include one or more physics-based flow simulators for simulating reservoirs, wells and surface-pipeline hydraulics, wherein the simulation engines also include an economic computation engine;

repeatedly perform a set of operations, wherein the set of operations includes said selecting, said executing the well-perforator program, said assembling the instantiated models and perforation locations, and said executing the simulation engines

6. Claim 21 has been amended as following:

A computer-implemented method comprising:

a computer system performing setup operations to assemble a case comprising a set of planning variables and models, wherein at least one of said models is a high-resolution geocellular reservoir model;

the computer system executing a calculation loop a plurality of times, wherein each iteration of the calculation loop includes:

automatically generating instantiations of the planning variables to determine instantiated models from the models, wherein said selecting values of the variables in their respective ranges is performed according to an operational mode, wherein the operational mode is selected by a user from a set of operational modes including a Monte Carlo mode, a discreet combinations mode and a sensitivity analysis mode;

automatically executing well-perforator software on one or more well plans included in the instantiated models in order to determine perforation locations associated with the one or more well plans;

automatically executing a plurality of simulation engines on the instantiated models and the perforation locations, wherein the simulation engines include one or more physics-based flow simulators for simulating reservoirs, wells and surface-pipeline hydraulics, wherein the simulation engines also include an economic computation engine; and

automatically capturing the instantiated planning variables and output data from the simulation engines onto a storage medium.

7. Claim 42 has been amended as following:

A computer-implemented method comprising:

a computer system receiving user input characterizing probability distributions for planning variables associated with a set of models, wherein the set of models includes one or more high-resolution geocellular reservoir models;

the computer system generating instantiated values of the planning variables, wherein said selecting values of the variables in their respective ranges is performed according to an

operational mode, wherein the operational mode is selected by a user from a set of operational modes including a Monte Carlo mode, a discreet combinations mode and a sensitivity analysis mode;

the computer system assembling one or more input data sets for a plurality of simulation engines from the set of models and the instantiated values, wherein said assembling includes resolving uncertain event dates in one or more schedules included in the set of models based on a first subset of the instantiated values;

the computer system executing a well perforator program based on a second subset of the set of models and a second subset of the instantiated values.

the computer system executing the simulation engines on the one or more input data sets, wherein the simulation engines include one or more physics-based flow simulators for simulating reservoirs, wells and surface-pipeline hydraulics, wherein the simulation engines also include an economic computation engine;

the computer system storing the instantiated values of the planning variables and data output from the simulation engines to a storage medium; and

the computer system repeatedly performing a set of operations, wherein the set of operations includes said generating, said assembling, said executing a well perforator, said executing the simulation engines, and said storing until a termination condition is achieved.

8. Claim 48 has been amended as following:

A computer-implemented method comprising:

(a) a computer system receiving user input characterizing a set of planning variables associated with a set of models;

(b) the computer system generating instantiated values of the planning variables, wherein said selecting values of the variables in their respective ranges is performed according to an operational mode, wherein the operational mode is selected by a user from a set of operational modes including a Monte Carlo mode, a discreet combinations mode and a sensitivity analysis mode;

(c) the computer system assembling a first input data set using a first subset of the instantiated values and a first subset of the set of models, and assembling a second input data set using a second subset of the instantiated values and a second subset of the set of models, wherein the first subset of the set of models includes a high-resolution geocellular reservoir model;

(d) the computer system executing a well-perforator program to determine well perforation locations for wells in the first input data set, and appending the well perforation locations to the first input data set;

(e) the computer system determining instantiated schedules using a third subset of the instantiated values and a third subset of the models, and appending the instantiated schedules to the first input data set and the second input data set;

(f) the computer system executing one or more physics-based flow simulators on the first input data set to generate flow data for oil, gas and water and appending the flow data to the second input data set, wherein the one or more physics-based flow simulators are configured to simulate reservoirs, wells and surface-pipeline hydraulics;

(g) the computer system executing an economic computation engine on the second input data set to generate economic output data;

(h) the computer system storing the instantiated values of the planning variables, the flow data and the economic output data to a storage medium in a relational database format; and

(i) the computer system repeating a set of operations until a termination condition is achieved, wherein the set of operations includes (b), (c), (d), (e), (f), (g) and (h).

Allowable Subject Matter

Claims 1, 7, 9-10, 13, 16-21, 23-24, 27-28, 30, 42, 45, and 48-56 are allowed. The following is an examiner's statement of reasons for allowance:

9. As per claims 1, 10, 13, 17, 19, 21, 42, and 48, the Applicants' Admitted Prior Art, Gorell et al. (Trends in Reservoir Simulation: Big Models Scalable Models? Will you Please Make up Your Mind?, SPE 71596, SPE Annual Technical Conference and Exhibition, 9/2001), and Netemeyer et al. (U.S. Pub. 2002/0169785 A1) do not teach generating instantiated values of the planning variables, by giving a user a choice to select a mode from three different modes presented to the user recited as wherein said selecting values of the variables in their respective ranges is performed according to an operational mode, wherein the operational mode is selected by a user from a set of operational modes including a Monte Carlo mode, a discreet combinations mode and a sensitivity analysis mode. This feature is described in the specification on page 13 last paragraph through page 14 first paragraph.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably

accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cuong V. Luu whose telephone number is 571-272-8572. The examiner can normally be reached on Monday-Friday 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah, can be reached on 571-272-2279. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. An inquiry of a general nature or relating to the status of this application should be directed to the TC2100 Group receptionist: 571-272-2100.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Kamini S Shah/

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